CLAIMS

What is claimed is:

1. A method for measuring a current in an integrated circuit comprising:

simultaneously measuring a first output count from a first voltage controlled oscillator (VCO) using a first measurement voltage, and a second output count from a second VCO using a second measurement voltage; and

calculating the current in the integrated circuit using a voltage equivalent to a difference between the first and second output counts.

2. The method of claim 1 wherein the first measurement voltage and the second measurement voltage are associated with opposite sides of a resistance.

3. The method of claim 2 wherein the resistance is an inherent resistance in the integrated circuit package.

4. The method of claim 2 wherein the inherent resistance is measured by measuring a voltage drop across the inherent resistance while applying a known current through the inherent resistance.

5. The method of claim 1 wherein the first measurement voltage and the second measurement voltage are associated with points on an integrated circuit power supply grid.

6. The method of claim 1 further comprising:

controlling a power supply current based upon a calculated integrated circuit current.

7. A system for monitoring the current in an integrated circuit comprising:

an integrated circuit power supply line having a first measurement point and a second measurement point;

a voltage controlled oscillator (VCO) having a control input adapted to be alternatively coupled to the first and second measurement points; and

a counter coupled to an output of the VCO.

8. The system of claim 7 further comprising:

a controller coupled to the counter and adapted to calculate a difference in VCO counts for the first and second measurement points.

9. The system of claim 8 wherein the power supply line has a known inherent resistance and wherein the controller calculates a current demand in the integrated circuit.

10. The system of claim 8 wherein the controller adjusts a power supply current.

11. A circuit comprising:

an inverter;

a pass gate circuit coupled to an output of the inverter and operating to allow current to flow in an amount proportional to a control voltage; and

an amplifier coupled to the output of the pass gate circuit.

12. The circuit of claim 11 wherein the pass gate circuit comprises:

a PFET transistor having a gate coupled to the control voltage; and

an NFET transistor having a gate coupled to an inverted control voltage;

wherein a source of the PFET transistor and a source of the NFET transistor are coupled to the inverter, and a drain of the PFET transistor and a drain of the NFET transistor are coupled to the amplifier.

13. The circuit of claim 12 wherein a higher level of current is allowed to flow in the circuit as the control voltage is increased.

14. The circuit of claim 11 wherein the circuit represents a first stage of an oscillator and further comprising:

a second stage identical to the first stage and coupled to an output of the first stage; and

a third stage identical to the first stage and coupled to an output of the second stage, and an output of the third stage coupled to an input of the first stage.

15. A voltage controlled oscillator (VCO) comprising:

three stages connected together in a ring, wherein each stage comprises:

an inverter;

a pass gate circuit coupled to an output of the inverter and operating to allow current to flow in an amount proportional to a control voltage; and

an amplifier coupled to the output of the pass gate circuit;

a control voltage input coupled to the pass gate circuit of each stage; and

an output between two of the stages.

16. The VCO of claim 15 wherein signals circulate through the three-stage ring at a rate proportional to the control voltage.

17. The VCO of claim 15 wherein a signal at the output has a frequency proportional to the control voltage.

18. The VCO of claim 15 further comprising:

a counter coupled to the output.

19. The VCO of claim 17 wherein the counter counts output pulses over a selected interval of time.

20. The VCO of claim 18 further comprising:

a controller coupled to the counter; and

wherein the controller associates an output count with a voltage level.